

Surface Mount Solid Polymer Aluminum Electrolytic Capacitors

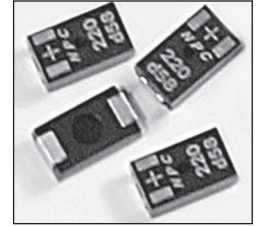
NPC Series

FEATURES

- LOW IMPEDANCE & ESR AT HIGH FREQUENCY
- HIGH RIPPLE CURRENT
- REPLACES MULTIPLE TANTALUM CHIPS IN POWER SUPPLIES
- FITS EIA (7343) "D" LAND PATTERNS
- Pb-FREE (GOLD TERMINATION PLATING)
- COMPATIBLE WITH +260°C* REFLOW SOLDERING

RoHS Compliant
includes all homogeneous materials

*See Part Number System for Details



CHARACTERISTICS

| | | | | | | | |
|---|-----------------------|--|--|-----|--------------|------|------|
| Rated Working Range | 2.0 ~ 10VDC | | | | | | |
| Rated Capacitance Range | 22 ~ 470μF | | | | | | |
| Operating Temperature Range | -55 ~ +105°C | | | | | | |
| Capacitance Tolerance | ± 20% (M) | | | | | | |
| Max. Leakage Current (μA) After 5 Minutes (+20°C) | ≤0.04CV | | | | | | |
| Surge Voltage (1000 cycles, 30 sec. on, 5 min. 30 sec. off, 1KΩ) | Working Voltage (Vdc) | 2.0 | 2.5 | 4.0 | 6.3 | 8.0 | 10 |
| | Surge Voltage (Vdc) | 2.6 | 3.2 | 5.2 | 8.2 7.8** | 10.4 | 11.5 |
| Max. Tan δ, 120Hz, +20°C | D1, D6 | ≤0.05 | | | | | |
| | D5, D7, D8 | ≤0.1 | | | | | |
| High Temperature Load Life 2,000 Hours @ 105°C at Rated Working Voltage after 2x recommended reflow profile | Capacitance Change | Within ±20% of initial measured value **/**/****Within ±30% of initial measured value | | | | | |
| | Tan δ | D7, D8 | Less than 150% of specified max. value | | | | |
| | | D1, D5, D6 | Less than 200% of specified max. value | | | | |
| | Leakage Current | Less than specified max. value | | | | | |
| Moisture Resistance 500 Hours @ +60°C at 90 ~ 95% RH and No Voltage Applied after 2x recommended reflow profile (JEDEC MSL-3) | Capacitance Change | Within -20%/+40% of initial measured value D5, **/**/****Within -20%/+60% of initial measured value | | | | | |
| | Tan δ | D7, D8 | Less than 150% of specified max. value | | | | |
| | | D1, D5, D6 | Less than 200% of specified max. value | | | | |
| | Leakage Current | Less than 300% of specified max. value | | | | | |

STANDARD PRODUCTS AND SPECIFICATIONS

//****Applies to values with asterisk in column "NIC Part Number"

| NIC Part Number (+260°C Reflow) | WV (Vdc) | Cap. (μF) | Max. LC (μA) | Tan δ | Max. Ripple Current (mArms) @ 100KHz | | | Max. ESR +20°C @ 100KHz (Ω) | Height H ± 0.1 | |
|------------------------------------|-------------|--------------|-----------------|-------|--------------------------------------|----------------|-----------------|-----------------------------------|-------------------|-----|
| | | | | | ≤45°C | 45°C < T ≤85°C | 85°C < T ≤105°C | | | |
| NPC101M2D5ZATRF | 2 | 100 | 8.0 | 0.10 | 6,300 | 4,400 | 2,700 | 0.009 | 1.1 | |
| NPC101M2D1UATRF | | 100 | 8.0 | 0.05 | 8,100 | 5,600 | 3,000 | 0.005 | 1.4 | |
| NPC101M2D1ZATRF | | 100 | 8.0 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.4 | |
| NPC101M2D6XATRF | | 100 | 8.0 | 0.05 | 5,400 | 3,700 | 3,000 | 0.013 | 1.9 | |
| NPC101M2D6ZATRF | | 100 | 8.0 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9 | |
| NPC121M2D6ZATRF | | 120 | 9.6 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9 | |
| NPC151M2D5ZATRF | | 150 | 12.0 | 0.10 | 6,300 | 4,400 | 2,700 | 0.009 | 1.1 | |
| NPC151M2D1UATRF | | 150 | 12.0 | 0.05 | 8,100 | 5,600 | 3,000 | 0.005 | 1.4 | |
| NPC151M2D6ZATRF | | 150 | 12.0 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9 | |
| NPC181M2D5ZATRF | | 180 | 14.4 | 0.10 | 6,300 | 4,400 | 2,700 | 0.009 | 1.1 | |
| NPC181M2D6ZATRF | | 180 | 14.4 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9 | |
| NPC221M2D5ZATRF | | 220 | 17.6 | 0.10 | 6,300 | 4,400 | 2,700 | 0.009 | 1.1 | |
| NPC221M2D6YATRF | | 220 | 17.6 | 0.05 | 7,000 | 4,900 | 3,000 | 0.007 | 1.9 | |
| NPC221M2D6ZATRF | | 220 | 17.6 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9 | |
| NPC221M2D7XATRF | | 220 | 17.6 | 0.10 | 6,000 | 4,200 | 3,500 | 0.010 | 2.7 | |
| NPC271M2D6ZATRF* | | 270 | 21.6 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9**** | |
| NPC271M2D6YATRF* | | 270 | 21.6 | 0.05 | 7,500 | 5,200 | 3,500 | 0.006 | 1.9**** | |
| NPC271M2D8YATRF | | 270 | 21.6 | 0.10 | 7,000 | 4,900 | 3,500 | 0.007 | 2.9 | |
| NPC331M2D6ZATRF* | | 330 | 26.4 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9**** | |
| NPC331M2D6YATRF* | | 330 | 26.4 | 0.05 | 7,500 | 5,200 | 3,500 | 0.006 | 1.9**** | |
| NPC331M2D6UATRF* | | 330 | 26.5 | 0.05 | 8,500 | 5,900 | 3,500 | 0.0045 | 1.9**** | |
| NPC331M2D8YATRF | | 330 | 26.4 | 0.10 | 7,000 | 4,900 | 3,500 | 0.007 | 2.9 | |
| NPC391M2D8YATRF | | 390 | 31.2 | 0.10 | 7,000 | 4,900 | 3,500 | 0.007 | 2.9 | |
| NPC471M2D6UATRF*** | | 470 | 37.6 | 0.05 | 8,500 | 5,900 | 3,500 | 0.0045 | 1.9**** | |
| NPC471M2D8YATRF | | 470 | 37.6 | 0.10 | 7,000 | 4,900 | 3,500 | 0.007 | 2.9 | |
| NPC820M2.5D1ZATRF | | 2.5 | 82 | 8.2 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.4 |
| NPC820M2.5D6XATRF | | | 82 | 8.2 | 0.05 | 5,400 | 3,700 | 3,000 | 0.013 | 1.9 |
| NPC820M2.5D6ZATRF | | | 82 | 8.2 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9 |
| NPC101M2.5D5ZATRF | | | 100 | 10.0 | 0.10 | 6,300 | 4,400 | 2,700 | 0.009 | 1.1 |
| NPC101M2.5D1UATRF | | | 100 | 10.0 | 0.05 | 8,100 | 5,600 | 3,000 | 0.005 | 1.4 |

//****See note regarding capacitance change in characteristics table (Endurance & Moisture Resistance).
****height dimension tolerance ±0.2mm



Surface Mount Solid Polymer Aluminum Electrolytic Capacitors

NPC Series

STANDARD PRODUCTS AND SPECIFICATIONS

| NIC Part Number (+260°C Reflow) | WV | Cap. | Max. LC | Tan δ | Max. Ripple Current (mArms) @ 100KHz | | | Max. ESR +20°C @ 100KHz (Ω) | Height H ± 0.1 | |
|------------------------------------|-------|------|---------|-------|--------------------------------------|----------------|-----------------|-----------------------------------|-------------------|-----|
| | (Vdc) | (μF) | (μA) | | ≤45°C | 45°C < T ≤85°C | 85°C < T ≤105°C | | | |
| NPC101M2.5D6ZATRF | 2.5 | 100 | 10.0 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9 | |
| NPC121M2.5D1UATRF | | 120 | 12.0 | 0.05 | 8,100 | 5,600 | 3,000 | 0.005 | 1.4 | |
| NPC121M2.5D6ZATRF | | 120 | 12.0 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9 | |
| NPC151M2.5D5ZATRF | | 150 | 15.0 | 0.10 | 6,300 | 4,400 | 2,700 | 0.009 | 1.1 | |
| NPC151M2.5D6ZATRF | | 150 | 15.0 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9 | |
| NPC181M2.5D5ZATRF | | 180 | 18.0 | 0.10 | 6,300 | 4,400 | 2,700 | 0.009 | 1.1 | |
| NPC181M2.5D6ZATRF | | 180 | 18.0 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9 | |
| NPC181M2.5D7XATRF | | 180 | 18.0 | 0.10 | 6,000 | 4,200 | 3,500 | 0.010 | 2.7 | |
| NPC221M2.5D6YATRF* | | 220 | 22.0 | 0.05 | 7,500 | 5,200 | 3,500 | 0.006 | 1.9**** | |
| NPC221M2.5D6ZATRF* | | 220 | 22.0 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9**** | |
| NPC221M2.5D8YATRF | | 220 | 22.0 | 0.10 | 7,000 | 4,900 | 3,500 | 0.007 | 2.9 | |
| NPC271M2.5D6ZATRF* | | 270 | 27.0 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9**** | |
| NPC271M2.5D6YATRF* | | 270 | 27.0 | 0.05 | 7,500 | 5,200 | 3,500 | 0.006 | 1.9**** | |
| NPC271M2.5D8YATRF | | 270 | 27.0 | 0.10 | 7,000 | 4,900 | 3,500 | 0.007 | 2.9 | |
| NPC331M2.5D6YATRF* | | 330 | 33.0 | 0.05 | 7,500 | 5,200 | 3,500 | 0.006 | 1.9**** | |
| NPC331M2.5D8YATRF | | 330 | 33.0 | 0.10 | 7,000 | 4,900 | 3,500 | 0.007 | 2.9 | |
| NPC391M2.5D6YATRF* | | 390 | 39.0 | 0.05 | 7,500 | 5,200 | 3,500 | 0.006 | 1.9**** | |
| NPC391M2.5D8ZATRF | | 390 | 39.0 | 0.10 | 6,300 | 4,400 | 3,500 | 0.009 | 2.9 | |
| NPC471M2.5D8YATRF | | 470 | 47.0 | 0.10 | 7,000 | 4,900 | 3,500 | 0.007 | 2.9 | |
| NPC471M2.5D6UATRF*** | | 470 | 47.0 | 0.10 | 8,500 | 5,900 | 3,500 | 0.0045 | 1.9**** | |
| NPC680M4D5XATRF | 4.0 | 68 | 10.9 | 0.10 | 5,100 | 3,500 | 2,100 | 0.015 | 1.1 | |
| NPC680M4D1ZATRF | | 68 | 10.9 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.4 | |
| NPC680M4D6XATRF | | 68 | 10.9 | 0.05 | 5,400 | 3,700 | 3,000 | 0.013 | 1.9 | |
| NPC680M4D6ZATRF | | 68 | 10.9 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9 | |
| NPC820M4D6XATRF | | 82 | 13.1 | 0.05 | 6,000 | 4,200 | 3,000 | 0.010 | 1.9 | |
| NPC101M4D6XATRF | | 100 | 16.0 | 0.05 | 6,000 | 4,200 | 3,000 | 0.010 | 1.9 | |
| NPC121M4D6XATRF | | 120 | 19.2 | 0.05 | 6,000 | 4,200 | 3,000 | 0.010 | 1.9 | |
| NPC151M4D6XATRF | | 150 | 24.0 | 0.05 | 6,000 | 4,200 | 3,000 | 0.010 | 1.9 | |
| NPC151M4D7XATRF | | 150 | 24.0 | 0.10 | 6,000 | 4,200 | 3,500 | 0.010 | 2.7 | |
| NPC181M4D6ZATRF* | | 180 | 28.8 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9**** | |
| NPC181M4D8ZATRF | | 180 | 28.8 | 0.10 | 6,300 | 4,400 | 3,500 | 0.009 | 2.9 | |
| NPC221M4D6ZATRF* | | 220 | 35.2 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9**** | |
| NPC221M4D8ZATRF | | 220 | 35.2 | 0.10 | 6,300 | 4,400 | 3,500 | 0.009 | 2.9 | |
| NPC271M4D8ZATRF | | 270 | 43.2 | 0.10 | 6,300 | 4,400 | 3,500 | 0.009 | 2.9 | |
| NPC331M4D8ZATRF | | 330 | 52.8 | 0.10 | 6,300 | 4,400 | 3,500 | 0.009 | 2.9 | |
| NPC471M4D8ZATRF | | 470 | 75.2 | 0.10 | 6,300 | 4,400 | 3,500 | 0.009 | 2.9 | |
| NPC330M6.3D6XATRF | | 6.3 | 33 | 8.3 | 0.05 | 5,100 | 3,500 | 3,000 | 0.015 | 1.9 |
| NPC470M6.3D5XATRF | | | 47 | 11.8 | 0.10 | 5,100 | 3,500 | 2,100 | 0.015 | 1.1 |
| NPC470M6.3D1XATRF | | | 47 | 11.8 | 0.05 | 6,000 | 4,200 | 3,000 | 0.010 | 1.4 |
| NPC470M6.3D6XATRF | | | 47 | 11.8 | 0.05 | 5,400 | 3,700 | 3,000 | 0.013 | 1.9 |
| NPC470M6.3D6ZATRF | 47 | | 11.8 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9 | |
| NPC560M6.3D6XATRF | 56 | | 14.1 | 0.05 | 6,000 | 4,400 | 3,000 | 0.010 | 1.9 | |
| NPC680M6.3D6XATRF | 68 | | 17.1 | 0.05 | 6,000 | 4,400 | 3,000 | 0.010 | 1.9 | |
| NPC820M6.3D6XATRF | 82 | | 20.7 | 0.05 | 6,000 | 4,200 | 3,000 | 0.010 | 1.9 | |
| NPC101M6.3D6XATRF | 100 | | 25.2 | 0.05 | 6,000 | 4,200 | 3,000 | 0.010 | 1.9 | |
| NPC101M6.3D7XATRF | 100 | | 25.2 | 0.10 | 6,000 | 4,200 | 3,500 | 0.010 | 2.7 | |
| NPC121M6.3D6ZATRF* | 120 | | 30.2 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9**** | |
| NPC121M6.3D8ZATRF | 120 | | 30.2 | 0.10 | 6,300 | 4,400 | 3,500 | 0.009 | 2.9 | |
| NPC151M6.3D6ZATRF* | 150 | | 37.8 | 0.05 | 6,300 | 4,400 | 3,000 | 0.009 | 1.9**** | |
| NPC151M6.3D8ZATRF | 150 | | 37.8 | 0.10 | 6,300 | 4,400 | 3,500 | 0.009 | 2.9 | |
| NPC181M6.3D8ZATRF | 180 | | 45.4 | 0.10 | 6,300 | 4,400 | 3,500 | 0.009 | 2.9 | |
| NPC221M6.3D8ZATRF | 220 | | 55.4 | 0.10 | 6,300 | 4,400 | 3,500 | 0.009 | 2.9 | |

*/***See note regarding capacitance change in characteristics table (Endurance & Moisture Resistance).

****height dimension tolerance ±0.2mm



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NPC Series

STANDARD PRODUCTS AND SPECIFICATIONS

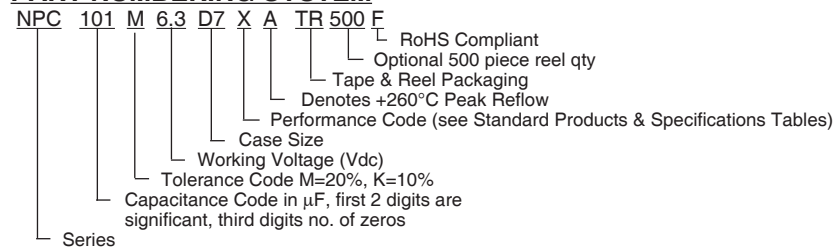
| NIC Part Number (+260°C Reflow) | WV | Cap. | Max. LC | Tan δ | Max. Ripple Current (mArms) @ 100KHz | | | Max. ESR +20°C @ 100KHz (Ω) | Height H ± 0.1 |
|------------------------------------|-------|------|---------|-------|--------------------------------------|----------------|-----------------|-----------------------------------|-------------------|
| | (Vdc) | (μF) | (μA) | | ≤45°C | 45°C < T ≤85°C | 85°C < T ≤105°C | | |
| NPC220M8D6ATRF | 8 | 22 | 7.0 | 0.05 | 4,700 | 3,200 | 2,500 | 0.018 | 1.9 |
| NPC330M8D6ATRF | | 33 | 10.6 | 0.05 | 4,700 | 3,200 | 2,500 | 0.018 | 1.9 |
| NPC330M8D7XATRF | | 33 | 10.6 | 0.10 | 5,400 | 3,700 | 3,000 | 0.013 | 2.7 |
| NPC470M8D6ATRF | | 47 | 15.1 | 0.05 | 4,700 | 3,200 | 2,500 | 0.018 | 1.9 |
| NPC680M8D7ATRF | | 68 | 21.8 | 0.10 | 4,700 | 3,200 | 2,500 | 0.018 | 2.7 |
| NPC101M8D7ATRF | | 100 | 32.0 | 0.10 | 4,700 | 3,200 | 2,500 | 0.018 | 2.7 |
| NPC101M8D7XATRSF | | 100 | 32.0 | 0.10 | 5,600 | 3,900 | 3,300 | 0.012 | 2.7 |
| NPC220M10D6ATRF | 10 | 22 | 8.8 | 0.10 | 3,700 | 2,500 | 1,600 | 0.030 | 1.9 |
| NPC470M10D6ATRF* | | 47 | 18.8 | 0.10 | 4,000 | 2,800 | 1,800 | 0.025 | 1.9**** |

NPC101M8D7XATRSF 1,000 hour load life

*/***See note regarding capacitance change in characteristics table (Endurance & Moisture Resistance).

****height dimension tolerance ±0.2mm

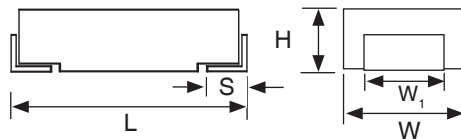
PART NUMBERING SYSTEM



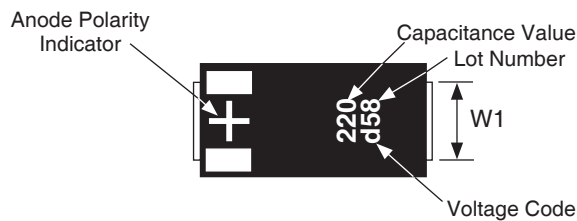
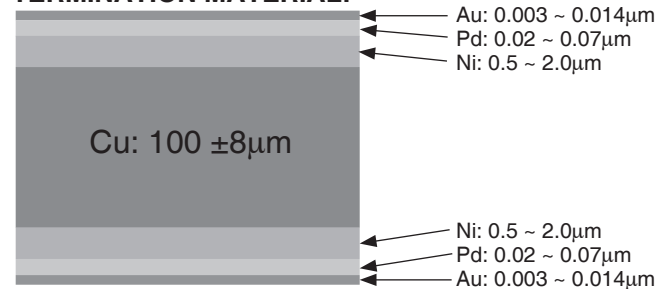
DIMENSIONS (mm)

| Case Code | L ±0.2 | W ±0.2 | H ±0.1 | W1 ±0.1 | S ±0.2 |
|-----------|--------|--------|--------|---------|--------|
| D1 | 7.3 | 4.3 | 1.4 | 2.4 | 1.2 |
| D5 | | | 1.1 | | |
| D6 | | | 1.9* | | |
| D7 | | | 2.7 | | |
| D8 | | | 2.9 | | |

*D6 - See Standard Products & Specifications Tables for height tolerance.



TERMINATION MATERIAL:



VOLTAGE CODES

| Voltage | Code |
|---------|------|
| 2.0VDC | d |
| 2.5VDC | e |
| 4.0VDC | g |
| 6.3VDC | j |
| 8.0VDC | k |
| 10VDC | A |

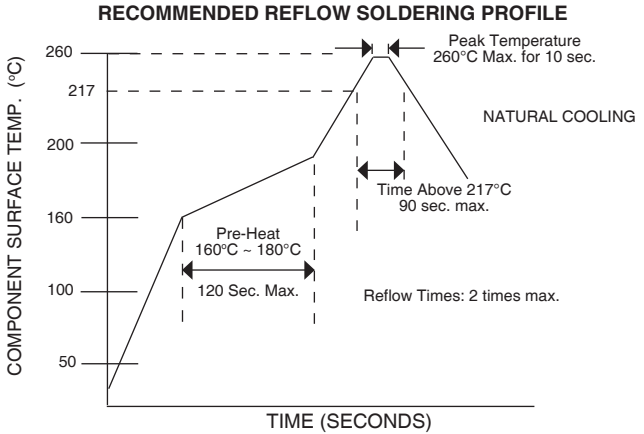
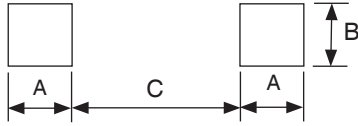


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NPC Series

RECOMMENDED LAND PATTERNS (mm)

| Case Code | a | b | c |
|--------------------|-----|-----|-----|
| D1, D5, D6, D7, D8 | 2.4 | 2.9 | 3.7 |



APPLICATION NOTES:

1. NPC Series cannot be used in coupling, time-constant or other circuits that are greatly affected by leakage current.
2. NPC parts are polarized so be sure to verify component orientation when mounting components.
3. Do not apply over voltage exceeding the rated voltage.
4. Do not apply ripple current over the specified maximum ripple current rating.

NOTES ON REFLOW SOLDERING:

1. SAC alloy (+217°C) reflow soldering compatible
2. Soldering heat limits apply to the top surface of component
3. If you have concerns about your reflow soldering profile review them with NIC to insure compatible [tpmg@niccomp.com]

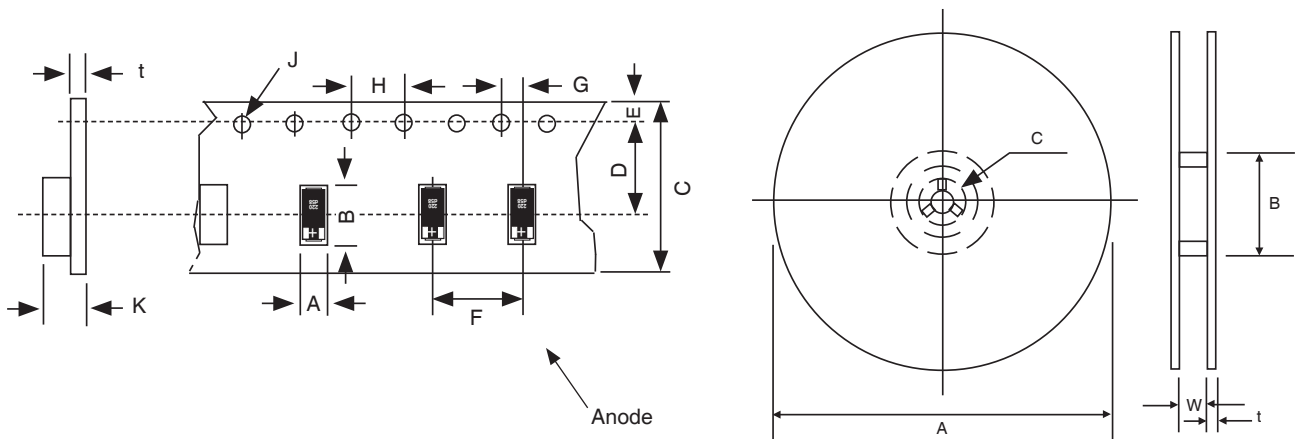
REEL TAPE DIMENSIONS (mm)

| Case Code | A ±2.0 | B ±1.0 | C ±0.2 | W ±1.0 | t ±0.5 | Reel Quantity | |
|------------|--------|--------|--------|--------|--------|---------------|------|
| D1, D5, D6 | 330 | 80 | 13 | 13.5 | 2.0 | 3,500 | 500* |
| D7, D8 | | | | | | 2,000 | |

*See part number system for details on designating reel quantity

TAPE DIMENSIONS (mm)

| Case Code | A ±0.1 | B ±0.2 | C ±0.3 | D ±0.05 | E ±0.1 | F ±0.1 | G ±0.05 | H ±0.1 | J -0/+0.1 | K ±0.1 | t ±0.05 |
|-----------|--------|--------|--------|---------|--------|--------|---------|--------|-----------|--------|---------|
| D1 | 4.50 | 7.70 | 12.0 | 5.5 | 1.75 | 8.0 | 2.0 | 4.0 | 1.5 | 1.6 | 0.3 |
| D5 | | | | | | | | | | | |
| D6 | | | | | | | | | | | |
| D7 | | | | | | | | | | | |
| D8 | | | | | | | | | | | |



PRECAUTIONS

Please review the notes on correct use, safety and precautions found at www.niccomp.com/precautions
 If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: tpmg@niccomp.com

